Rice University
Department of Psychological Sciences

# PSYC 662: Non-Traditional Interfaces
# Fall 2018

Tuesday-Thursday 9:25 – 10:40, SH303

## Instructor

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Office Hours Monday 3:00-4:00, or by appointment

## Required Texts:

Kortum, P. (Ed.) (2008). *HCI Beyond the GUI: Design for Haptic, Speech, Olfactory and other Non-Traditional Interfaces*. Burlington, MA: Morgan Kaufmann.

You will also need to read the case studies on the companion website at www.beyondthegui.com. These case studies can also be found on Canvas

**Learning Outcomes:** At the end of this course, students will:
1) Have a clear understanding of the fundamental concepts in non-graphical interfaces
2) Understand the strengths and limitations of these different interaction modes
3) Be able to identify when each of these modes should be utilized in operational systems
4) Be able to specify the design of an engineered system using these kinds of interfaces so that it supports limitations imposed by human cognition, perception, and physical factors

| Class | Date | Topic | Readings |
|---|---|---|---|
| 1 | 8/21 | Introductions, Class logistics and the 8 Basic Principles of Design | Chapter 1<br>Norman, 2010 |
| 2 | 8/23 | History of User interfaces | |
| 3 | 8/28 | Haptic Interfaces | Chapter 2<br>Hill, 2013<br>Ito, 2013 |
| 4 | 8/30 | Haptic Interfaces Lab Tour | |
| 5 | 9/4 | Gesture Interfaces | Chapter 3<br>Chen, 2013<br>Jing, 2013<br>Garber, 2013<br>Grandhi, 2013 |
| 6 | 9/6 | Gesture Interfaces Lab | |
| 7 | 9/11 | Locomotion Interfaces | Chapter 4<br>Franks, 2013<br>Nabiyouni, 2015 |
| 8 | 9/13 | Applied non-traditional interfaces lab | |
| 9 | 9/18 | Sonified User Interfaces | Chapter 5<br>Nyeste, 2001<br>Hammerschmidt, 2013 |

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| 10 | 9/20 | Sonification Lab: K-Bat Sonar | |
| 11 | 9/25 | Speech Interfaces | Chapter 6<br>Jia, 2013<br>Stifelman, 2013<br>Ortiz, 2014 |
| 12 | 9/27 | Speech Interface Lab | |
| 13 | 10/2 | ***No class – Instructor at HFES***<br>*Work on your projects* | |
| 14 | 10/4 | ***No class – Instructor at HFES***<br>*Work on your projects* | |
| 15 | 10/9 | ***No class – Mid-term recess*** | |
| 16 | 10/11 | **Exam 1** Covers through speech interfaces | |
| 17 | 10/16 | IVR interfaces | Chapter 7<br>Asthana, 2015 |
| 18 | 10/18 | Olfactory interfaces | Chapter 8<br>Garcia-Ruiz, 2013 |
| 19 | 10/22 | Taste Interfaces | Chapter 9<br>Ranasinghe, 2012 |
| 29 | 10/25 | Impoverished Interfaces | Chapter 10<br>Choi, 2012<br>Freeman, 2014<br>Oney, 2013<br>Page, 2013<br>Perrault, 2013 |
| 21 | 10/30 | Impoverished interfaces Lab | |
| 22 | 11/1 | Multi-modal interfaces MEMM | Chapter 11 |
| 23 | 11/6 | Multi-modal Interfaces MIMM | Chapter 12<br>Oviatt, 2016 |
| 24 | 11/8 | MIMM-MEMM Lab | |
| 25 | 11/13 | Future interfaces 1 | Scherer, 2011<br>McFarland. 2011 |
| 26 | 11/15 | Future Interfaces 2 | Maynes-Aminzade, 2003 |
| 27 | 11/20 | **Exam 2** Covers IVR to end | |
| 28 | 11/22 | ***No class – Thanksgiving Break*** | |
| 29 | 11/27 | Project Presentations | |
| 30 | 11/29 | Project Presentations<br>Papers dues | |

## Examinations:

There will be 2 examinations, but no Final Exam. The 2 in class exams will be closed book/closed note and may cover any of the material assigned up to that point. This includes material from HCI Beyond the GUI, assigned readings, my lecture notes, lab tours, lab exercises and presentations that other students have given.

## Presentations:

Each student will be required to give a presentation during the course of the semester on a specific interface that interests them. These will not be surveys of the general interface technology, but will be an interesting example of a specific implementation. You will be required to give a 15 minute talk about the interface, talking about its technical implementation, the human factors that would/should have gone into its design, and any design deficiencies you believe still exist. Examples may be chosen from commercially available devices or research devices that are still in the laboratory, but may make it out to the commercial realm. The presentation should provide copious pictures, movies or auditory examples of the interface. No report is required for this presentation, but you must supply me with a copy of the presentation material after the talk. You may choose from any covered interfaces. We will go through the selection process on the second day of class, as only a limited number of students may present each topic. Once you have an interface area, your specific interface must be approved by me.

## Project:

Each student team will build a (functional) non-traditional interface. We will be building NTI's for the operation of automobile environmental, entertainment, operational and navigation systems for a ***Level 4 autonomous vehicle***. Strictly MEMM and MIMM systems involving traditional interface modes are not allowed. The interface must be operational (WOZ is ok) and perform the core functions. You should document the process of defining and constructing the interface for inclusion in the end report. You will be required to present the interface to the class at the end of the semester in a 15 minute presentation, demonstrating the interface and allowing others to use the interface as well. The report is due the last day of the semester and should include the process that was used to arrive at the interface as well as mock-ups, sketches, prototypes, drawings used in the process.

- Environmental Systems include: AC, heater, defroster, heated and cooled seats, front and rear AC zones, passenger/driver AC zones, air levels etc.
- Entertainment and Navigation systems include CD, stereo, iPod integration, DVD (two screens in back), AM/FM/Satellite mappings, destination setting, directional information to driver, off course info, way points and points of interest
- Operational systems include door lock, windows, phone Bluetooth, drive selection, lane departure warning, blind spot warning, collision detection and braking system, backup camera

**_Of particular note_**, you must coordinate with the rest of the class to insure that the 3 described systems work seamlessly together, as they would have to in a real automobile.

Documented human factors requirements should be included in the final implementation. Originality of the interface is one component of the grade.

## Participation:

A good deal of this class will entail open discussions of human factors issues of these interfaces, as well as discussions of student presentations and lab exercises. Active, thoughtful participation is expected from every student. There are no make-ups on participation assignments.

## Evaluation:

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| Exams 1 and 2 | 25% each (total 50%) |
| Project: | 25% |
| Presentation | 10% |
| Participation | 15% |

- Gesture, sonification, speech, impoverished labs are worth 3% each
- Haptic lab tour, MIMM-MEMM lab and general participation are worth 1% each

## Disabilities

If you have a documented disability or other condition that may affect academic performance you should: 1) make sure this documentation is on file with Disability Support Services (Allen Center, Room 111 / adarice@rice.edu / x5841) to determine the accommodations you need; and 2) talk with me to discuss your accommodation needs.

## Honor System Policy

As with all endeavors at Rice, in this class you are expected to adhere to the Rice Honor Code, a code that you pledged to honor when you matriculated at this institution. If you are unfamiliar with the details of this code and how it is administered, you should consult the Honor System Handbook at http://honor.rice.edu/honor-system-handbook/. This handbook outlines the University's expectations for the integrity of your academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process.

Exams are given under the honor system. Students are encouraged to work collaboratively on the projects, but each student is expected to contribute an equal share to the final project. I will be using a peer review process to assess the contributions of all the team members. Each team must work independently on the project. Students are encouraged to bring any concerns involving academic integrity to the attention of the instructor.

## Syllabus Change Policy

This syllabus is only a guide for the course and is subject to change with advanced notice.